

## ATTACHMENT A

### Remarks

By this Amendment, independent claim 1 has been amended to better define the invention while dependent claim 15 has been amended to correct an inadvertent error which made it inconsistent with claim 1. In addition, allowable dependent claims 16-28 have been rewritten in independent form as new claims 29-41. It is submitted that the present application is in condition for allowance for the following reasons.

In the *Claim Rejections - 35 USC § 102 and § 103* sections of the outstanding Office Action, independent claim 1 and dependent claims 2-15 were rejected as being anticipated by or obvious over August. However, for the following reasons, it is submitted that amended claim 1 and all claims dependent therefrom are allowable over this reference.

By this Amendment, independent claim 1 has been amended to refer to "simultaneously subjecting a first of said pair of piezo-resistors to compression and a second of said pair of piezo-resistors to tension...".

In the Office Action, the Examiner rejects claim 1 under 35 USC § 102 as lacking novelty over August. The Examiner asserts that the relevant portion of the sensor of August can extend or bend "subjecting the piezo-resistors to compression and tension", thereby inducing a change in relative resistance of the resistors. The Examiner directs applicant's attention to column 2 line 46 and to claims 20 and 21 in August.

However, these portions of August merely explain that resistor structure 210 should be located at an inflection portion 501, 502, 503 or 504 "between the compressive and tensile portions of surface 202" (see column 4 lines 58 to 60) so that

“the intrinsic stresses or their variation over temperature will not degrade the electrical characteristic of component 200” [column 4 lines 60 to 62]. That is, resistance structure 210 is carefully located to avoid being exposed to compressive and tensile forces arising from, for example, flexing or warping of component 200 due to undesirable fluctuations in environmental temperature. This disclosure thus teaches against subjecting resistance structure 210 to compression or tension, and certainly contains no disclosure of simultaneously subjecting one resistor to compression and another to tension, as now clearly defined in independent claim 1 as amended.

So that component 200 in August can act as a pressure sensor, component 200 has a recess or cavity 401 and a pressure sensitive diaphragm or membrane 403, most clearly seen in the cross-sectional views of Figures 4 and 5 of August. As is explained beginning from column 4 line 19, during operation of component 200, “pressure is applied to surface 202 of diaphragm 403 through layer 300, and diaphragm 403 deflects in response to the applied pressure.” As a result, the resistance of each of the resistors in resistor structures 210 changes “by different amounts” depending on their alignment.

There is no disclosure in August, however, that the individual resistors of resistor structure 210 are arranged so that at least one resistor is subjected to compression while at least one other resistor is simultaneously subjected to tension. August is somewhat vague on exactly how they should be arranged. However, the clearest disclosure of the operation of the individual resistors is in the embodiment of Figure 9, where the “Wheatstone Bridge” of resistors 910 is clearly shown. The resistors 910 are oriented parallel to each other, running from top to bottom in the view of Figure 9. Pressure applied to the central diaphragm of component 210 will thus expose the left

and right resistors to neither tension nor compression, but the upper and lower resistors will be subjected to exactly the same force, whether tensile or compressive, owing to their exactly symmetrical placement. As best understood, August then measures the difference in resistance between the unaffected (left and right) resistors and that of the affected upper and lower resistors, but at no point does August teach or suggest increasing sensitivity by arranging two of the resistors—as taught by the present invention—such that one is compressed while the other is tensed.

To clarify this distinction, independent claim 1 has been amended (as noted above) to define that the first piezo-resistor is subjected to compression and the second piezo-resistor is subjected to tension “simultaneously”. It is submitted, therefore, that independent claim 1 is neither disclosed nor made obvious by August so that claim 1 is thus allowable. For at least these same reasons, it is likewise submitted that dependent claims 2-15 (as well as claims 16-28) are also allowable over August.

Applicant also disagrees with various observations made by the Examiner concerning the dependent claims. For example, the Examiner contends, with respect to claim 7, that “August shows a plurality of piezo-resistors”. Claim 7, however, claims a strain gauge with “three load points and three pairs of piezo-resistors”, an embodiment illustrated in Figure 5 of the present application. There is no disclosure in August of three pairs of piezo-resistors, and certainly no disclosure of three load points (see load points 54a,b,c in Figure 5 of the present application).

Similarly, the Examiner contends that claim 6 is obvious, presumably on the basis that there is little inventive distinction between a single load point and plural load points. However, there is no teaching or suggestion whatsoever in August of how

component 200 could be varied or otherwise modified to have more than one load point. The component of 200 measures pressure according to the force applied to diaphragm 403, and it is by no means clear how component 200 or diaphragm 403 could be modified as the Examiner suggests—such as according to intended application—to include plural load points.

It is submitted, therefore, that dependent claims 6 and 7 are novel and inventive over the cited art and additionally allowable for this reason. Further, it will be noted that independent claim 1 and dependent claims 2 to 28 all include the recitation of a plurality of load points. Thus, similarly, these claims are additionally novel and inventive over the cited art for this reason.

The Examiner also suggests that claim 15 lacks novelty over August. However, August does not disclose the use of tethers, nor the use of silicon tethers for connecting a strain sensing element to a plurality of load points. Indeed, component 200 does not require tethers: diaphragm 403 is integral with substrate 201, being formed from the original substrate blank through the etching the underside of substrate 201 to form recess or cavity 401 [column 3 lines 48 and 49]. As a result, the diaphragm 403 is in continuous, uninterrupted connection with substrate 201, so that there is no feature that could be properly termed a “tether” as would be understood by one of ordinary skill in the art.

A passivation layer 300 in August is applied to the upper surface of diaphragm 403, and this passivation layer may be provided with a variety of holes (e.g. holes 311 and 312 shown in Figure 3). Again, however, passivation layer 300 is not tethered, as it

is applied directly to the upper surface of substrate 210 and diaphragm 403, as visible in the cross-sectional views of Figure 4 and 5.

Thus, it is submitted that claim 15 is also additionally novel and inventive over the cited art.

In paragraph #4 of the Detailed Action, the examiner indicates that dependent claims 16-28 all contained allowable subject matter and thus would be allowable if rewritten in independent form. This indication of allowable subject matter is appreciated. By this Amendment, dependent claim 16 has been rewritten in independent form as new independent claim 29; with claims 30-41 dependent therefrom which correspond to original dependent claims 17-28. Therefore, new claims 29-41 are also allowable.

For all of the foregoing reasons, it is submitted that the present application is in condition for allowance and such action is solicited.